

Blockchain-Based- E-Tender Management System

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Abstract: *The tendering or contracts are used by governments and companies to procure goods or services providers. E-tendering being the mostly used for procurement method, there are various security implications present. To solve these this issue, we use Blockchain technology. We use of blockchain technology to secure transaction-based documents along with transactions such as to provide a completely transparent tendering process, tender documents, applications, bid proposals, company profiles, past records, approving officer details, and rejections details are all required. In these paper, how smart contracts can be employed to design a distributed e-tendering system is explored. The project is divided into four sections, 1. Tender creations and publishing process, 2. Bidding process on the tender, 3. Evaluations and Negotiation of the bid and 4. Selections of the Winning bid.*

Keywords: Blockchain, Smart Contract, Ethereum, E-tender, Fair and Open tendering Scheme, Bidders

I. INTRODUCTION

Current E-Tendering System are not 'fair and open' meaning that the information is not shared with all stakeholders (Right to Information). The information is released on 'as they please' basic for example -when a company is selected as a winner of a contract, other companies that bid on the same tender are not notified of why their bid was rejected and why a particular company was selected as a winner. A Company can request this information but it is a tedious auditing this document is possible, evaluating the documents needs time. Aside from not being straightforward, security is additionally a significant issue for these entryways prompting misrepresentation and control of information put away in a brought together data set. If the hacker gets hold of this centralized database, bid can be leaked to competitors leading to major financial and strategic losses for a business.

Blockchain technology can be used to solve these security implications as it heavily focuses on the decentralization of information and is secured by encryption integrated with undeniable block-based architecture for transaction management.

Hence, Blockchain and smart contract can be used as a transparent, decentralized and secured tendering framework that will facilitate bidders' oversight on portal functions and observe all the activities carried out by the tender portal.

II. RELATED WORK

2.1 Tender Officer

Tender officer will login into the account after registration and update the notification regarding the tender process. There is a option where they can modify or delete the notification part. Now the officer will download the tender files for which were register by the bidders and decrypt the data from downloaded files to get the information of bidders. Once after getting the information of bidders as the acceptance for their tender application.

2.2 Bidder

Bidders will login into the account after registration and they will view tender notifications. If the bidder is okay with tender description, he will provide their information in text file to the bidder officer. After sending the application they can check the response from the tender officer can make a tender to the tender officer by providing data in a text file.

2.3 Blockchain

The blockchain is used to store an encrypted format by dividing the data into chunks. Here applies the hash code on chunks for hiding the data after converting it into an encrypted format which is stored in a database.

III. TECHNOLOGY AND CONCEPTS

3.1 Blockchain Explained

Blockchain is based on the concept of decentralization. Hence, it can be viewed as a distributed database. In this case, the distributed database employs the concept of full replication i.e., each node has a full copy of a blockchain. Whenever the blockchain needs to be updated because of a transaction, a process called mining takes place. A block consists of many transactions. A consensus protocol is used and the mined block is broadcasted to all other nodes. These blocks will have a cryptographic hash in the header that relates to the previous block in the chain. In the event that a square is controlled the hash related with these changes and therefore, all the procedure squares ought to be re-mined which is unimaginable. As such, blockchain utilizes the property of permanence. How the blockchain is implemented and what consensus protocol is the core of blockchain.

3.2 SHA-256

SHA-256 is quite possibly the most secure hashing capacities available. The US government requires its offices to secure certain touchy data utilizing SHA-256. While the specific subtleties of how SHA-256 functions are arranged, we realize that it is worked with a Merkle structure got from a single direction pressure work itself made with the Davies-Meyer structure from a particular square code. Three properties make SHA-256 this protected. To start with, it is practically difficult to reproduce the underlying information from the hash esteem. An animal power assault would have to make 2256 endeavour to create the underlying information. Second, having two messages with a similar hash esteem (called a crash) is incredibly improbable. With 2256 potential hash esteems (more than the quantity of molecules in the known universe), the probability of two being the equivalent is imperceptibly, tiny. At long last, a minor change to the first information modifies the hash esteem such a lot of that it's not evident the new hash esteem is gotten from comparative information; this is known as the torrential slide impact.

3.3 Natural Language Processing

NLP empowers PCs to comprehend regular language as people do. Regardless of whether the language is spoken or composed, normal language preparing utilizes man-made brainpower to take genuine information, measure it, and sort out it in a way a PC can comprehend. Similarly, as people have various sensors - like ears to hear and eyes to see - PCs have projects to peruse and mouthpieces to gather sound. And just as humans have a brain to process that input, computers have a program to process their respective inputs. At some point in processing, the input is converted to code that the computer can understand. There are two main phases to natural language processing: data pre-processing and algorithm development. Data pre-processing involves preparing and "cleaning" text data for machines to be able to analyse it. Pre-processing puts data in workable form and highlights features in the text that an algorithm can work with.

IV. PROPOSED WORK

Block chain technology is used in the proposed Tender Management System to ensure that the entire tender management process is secure and efficient. Encryption and an irrefutable block-based architecture for transaction management safeguard a block chain. This allows the system to maintain a basic transparent transaction with only the information that the system needs to know.

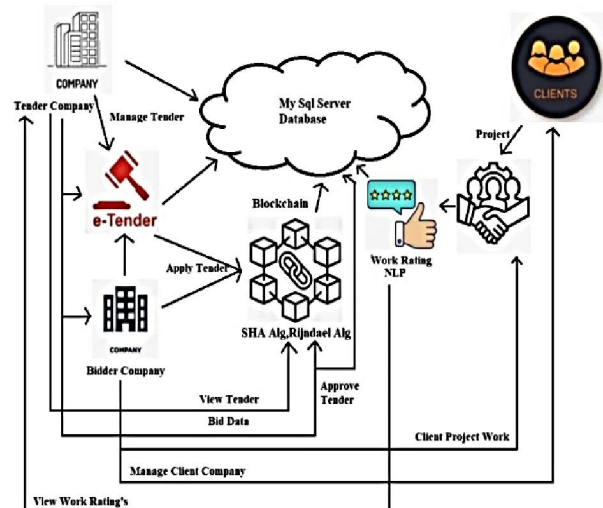
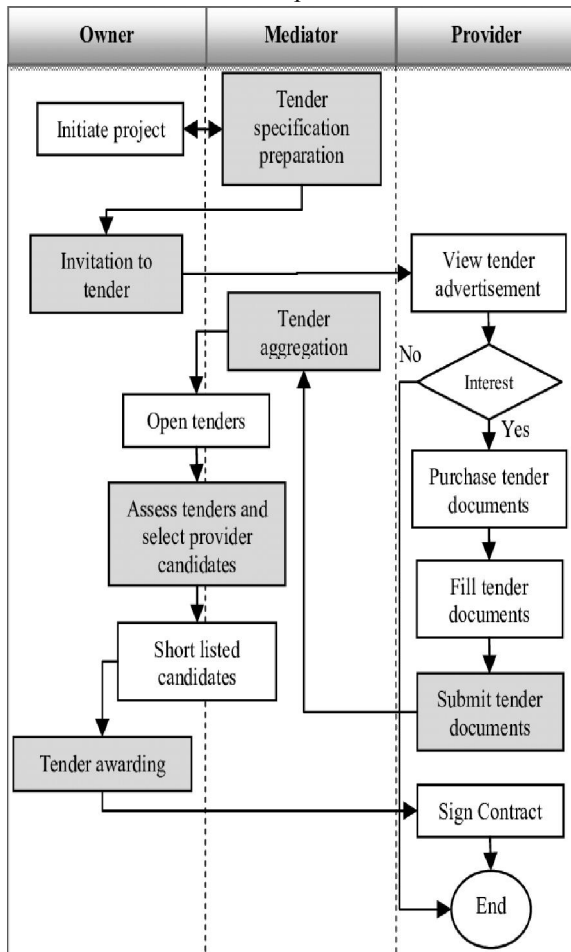
I) A tender is created by the tendering organization by specifying the details such as description, bidding period, etc.

- a) The stipulation of tender takes place i.e., the tendering company states its demands and the evaluation criteria on which a bid will be evaluated.**
- b) Once the tender details are finalized and the documents are provided, the tender is then sent to the blockchain in the form of a smart contract. The documents are stored in an encrypted form in a database and are only available to companies that are willing to bid.**

II) The bidder registers asynchronously with the system. The bidder is then shown all the tenders available for bid with tender details.

- a) The bidder then searches for appropriate tender for bidding.**
- b) The tender requirements are sent to the bidder along with the tendering organization details.**

III) The bidder then places a bid on the tender by providing a quote, quotation clauses. The bids are encrypted twice. With bidder's symmetric key and ii. Tender's public key (address of tender on the blockchain). The bidder also shows its credibility by providing its balance sheet, a license from ROC (Registrar of Companies) which are encrypted with the same key as discussed earlier. The bidder can only bid during the bidding period and once the deadline is reached, no further bids will be accepted.



IV) Once the deadline is passed the bids are open to the tendering organization for evaluation.

- The tendering organization gets the details of all the bids and decrypts the bid using the key provided by the bidder.
- Then the bid is evaluated and the credibility and capability of the bidding company are checked using the documents provided in the bid. The tendering organization can approve or reject the bid.

V) The tendering organization then selects the best bid as the winner. All the bidding and negotiation information is released to all the bidders. Thus, ensuring transparency.

4.1 Security Analysis

The security provided by a Blockchain based tendering system.

- The company that placed bids are not viewable to other bidders until the tender applied results are revealed.
- The blockchain network must be secure such that bidder company cannot change the bid of another bidder company.
- The tendering company cannot change the tender details once the tender is placed as they may change the requirements to help a particular group.
- The tender company can see the bids only when the date for applying tender is closed.
- Here, bids are encrypted. Hence, block cannot put a security implication on the system by miners

VI. CONCLUSION

As a conclusion, Tender Management System will be providing a new perspective on tender management inside Eagle Tender management System and also for the contractors. The incorporation of web-based application will make it much more convenient and easier to use almost everywhere via Internet connection. Therefore, Tender Management System will enhance of Eagle Tender management System Working and improves their communication to contractors.

When it comes to applications like tender management, where security and transparency is important and traditional technologies and old design patterns cannot be used as they might cause a risk of tampering data. As we know, there are many security requirements for a tendering system that cannot solved just by using a centralized database for creating and bidding the contracts. As we are using SHA and AES algorithm for encrypting the data and NLP concept for rating the client feedback, it helps the tender company for selecting the best bid among the list. Using technology like blockchain i.e., decentralized database, the security and openness required for this type of applications can be solved. In this paper, how such a system can be designed by mentioning various processes involved and their basic implementation are discussed.

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